

The Frankenstein syndrome

**Ethical and social issues in the
genetic engineering of animals**

BERNARD E. ROLLIN
COLORADO STATE UNIVERSITY



CAMBRIDGE
UNIVERSITY PRESS

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
40 West 20th Street, New York, NY 10011-4211, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© Cambridge University Press 1995

First published 1995

Reprinted 1996

Library of Congress Cataloging-in-Publication Data is available

A catalogue record for this book is available from the British Library

ISBN 0-521-47230-X hardback

ISBN 0-521-47807-3 paperback

Transferred to digital printing 2003

Contents

<i>Foreword by Franklin M. Loew</i>	<i>page xi</i>
<i>Preface</i>	<i>xiii</i>
Introduction	1
1 "There are certain things humans were not meant to do"	7
A Gresham's law for ethics	7
Scientific ideology and the denial of ethics in science	11
Science as encompassing values and ethics	18
"There are certain things humans were not meant to do": Is genetic engineering intrinsically wrong?	21
Theology and the alleged intrinsic wrongness of genetic engineering	22
Reductionism and genetic engineering	24
Genetic engineering and "species integrity"	32
Nature, convention, and genetic engineering	40
Environmental philosophy and genetic engineering	47
"Mixing human and animal traits"	63
Conclusion	66
2 Rampaging monsters	67
The issue of potential dangers arising from genetic engineering	67
The scientific community's tendency to ignore risks	70

Contents

Unanticipated dangers in genetic engineering	71
New technology and risk assessment	77
Values and risk assessment	80
“Bootstrapping”	82
Skepticism about “experts” judging risk	84
Democratic risk assessment – involving the public	92
The arrogance of “experts”	99
A viable model for regulation of genetic engineering	102
Possible dangers: Evolution in the fast lane	108
Possible dangers: Narrowing of the gene pool	111
Possible dangers: Unwittingly selecting for pathogens	114
Possible dangers: Genetically engineered disease models	115
Possible dangers: Environmental	117
Possible dangers: Military applications	133
Possible risks: Socioeconomic concerns	134
3 The plight of the creature	137
Animal welfare as a purely moral challenge	137
The traditional social ethic for animals: Anticruelty	139
How social ethics changes	143
Problems in the anticruelty ethic	146
The growing social concern with animal treatment	148
Beyond cruelty: The new social ethic for animals	154
Genetic engineering and the new ethic	168
How genetic engineering could help animals	169
Genetic engineering and animal “telos”	171
The principle of conservation of welfare	176
Genetic engineering and the welfare of agricultural animals	188
Altering animal products by genetic engineering	194
Genetic engineering and the welfare of research animals	195
Creating animal models of human genetic disease: A dilemma	200

Contents

Animal patenting	207
Conclusion	213
Appendix: What is genetic engineering of animals, and how is it done?	215
<i>Notes</i>	219
<i>References</i>	225
<i>Index</i>	231

Introduction

In 1984, I was approached by conference organizers with the request that I give the banquet speech at the first international conference ever held on genetic engineering of animals. Specifically, I was to address the topic of social and moral issues raised by the advent of this new and powerful technology. Flattered, stimulated, challenged, and totally ignorant, I accepted, confident of my ability to rise to the occasion by standing on the shoulders of my predecessors. Unfortunately, a brief visit to the university library shattered my preconceptions – I had no predecessors! My talk, in its published version, would be the first paper ever done on this major topic.¹ Suddenly, I saw my task under a new and harsher light. The buck stopped – and started – with me. Truly an academic's nightmare.

Seeking a purchase on the topic, I solicited dialogue from colleagues in my department. "Genetic engineering of animals," mused one such partner in discussion, "You're talking about the Frankenstein thing." His remark was largely ignored by me at first, as it seemed to me flippant and shallow. It was only later that I realized that he had opened a portal into the issue by forthrightly expressing what in fact rises to most people's minds when genetic engineering is mentioned. A week after our conversation, I was perusing new acquisitions in our university library when I encountered an extraordinary, newly published, five-hundred-page volume entitled *The Frankenstein Catalogue: Being a Comprehensive History of Novels, Translations, Adaptations, Stories, Critical Works, Popular Arti-*

Introduction

cles, Series, Fumetti, Verse, Stage Plays, Films, Cartoons, Puppetry, Radio and Television Programs, Comics, Satire and Humor, Spoken and Musical Recordings, Tapes and Sheet Music Featuring Frankenstein's Monster and/or Descended from Mary Shelley's Novel, appropriately authored by a man named Glut.² The book is precisely a comprehensive list and brief description of the works mentioned in the title. After recovering from my initial amazement that anyone would publish such a book, I was astonished anew by its content. It in fact lists 2,666 such works, including 145 editions of Mary Shelley's novel, the vast majority of which date from the mid-twentieth century. Putting these data together with my friend's remark, I experienced a flash of insight: Was it possible that the Frankenstein story was, in some sense, an archetypal myth, metaphor, or category that expresses deep concerns that trouble the modern mind? Could "the Frankenstein thing" provide a Rosetta stone for deciphering ethical and social concerns relevant to genetic engineering of life forms?

In the ensuing months, my hypothesis received succor. While visiting Australia, I met with an animal researcher whose field was teratology – the study of birth defects, literally, the study of monsters. He had been extremely surprised to find that his work with animals had evoked significant public suspicion, hostility, and protest. "I can't understand it," he told me. "There was absolutely no pain or suffering endured by any of the animals. All I can think of is that it must have been the Frankenstein thing." And in its 1985 cover story on the fortieth anniversary of the Hiroshima bombing, *Time* magazine invoked the Frankenstein theme as a major voice in post-World War II popular culture, indicating that this theme was society's way of expressing its fear and horror of a science and technology that had unleashed the atomic bomb.³

Those of us who recall the 1950s should be well aware of a fundamental change during the ensuing decades in social thought regarding science and technology. At that time, TV personalities mouthed – with a straight face – the advertisement that we could expect "better things for better living through chemistry." Sunday supplements were regularly

Introduction

salted (or peppered) with futuristic articles describing the “New Tomorrow” that science promised – colonization of other worlds, personal “fliers,” gold from the sea, robot servants, freedom from disease, unlimited energy from the atom, and so on. Scientists were heroic figures, dragon slayers, in popular culture and its vehicles. The brightest young people aspired to careers in science and engineering.

Four decades later, this naiveté appears laughable to a society cynical and pessimistic about science and technology. Justifiably or not, science and technology have become whipping boys for social ills. (Notoriously, citizens do not distinguish science from technology.) Science is blamed for pollution of air and water, for failing to conquer disease and for iatrogenic disease, for cavalier treatment of human and animal research subjects. Traditional family farms have disappeared with alarming rapidity due to their inability to compete in high technology agriculture. Technology is seen as eroding personal freedom and privacy through computerized record keeping and electronic eavesdropping. Three Mile Island and Chernobyl have perhaps irreversibly damaged public faith in nuclear power. The war on cancer is not won; health care costs are unmanageable; life is often prolonged at great expense to the terminally ill with little regard for life’s quality. Computers and video technology are often seen by educators as an alternative to good, human teaching, not as a supplement thereto. And scandals about data falsification, funding misappropriation, and bickering about credit for discoveries in science have helped erode the status of scientists as heroes and demigods. Malpractice suits have done the same for physicians, aided by the ever-increasing tendency of physicians to see themselves as scientists dealing with lawlike phenomena, not healers dealing with individuals. Astronauts have died tragically; space telescopes have been laughably problem ridden. And government surveys objectively document that fewer bright children seek careers in science and that public confidence in science continues to wane.⁴

It is thus no surprise that the Frankenstein story strikes a socially responsive chord, providing us with a way of articu-

Introduction

lating our fears and doubts about science and technology, a vehicle for packaging and personifying them in a form that allows us to shudder at them, see them vanquished, and go about our business. In and of itself, such personification is benign and even salubrious, purging us, as Aristotle said, of fears we would otherwise suppress. This sort of personified externalization is as old as humanity. On the other hand, when and if the myth becomes reified or transformed into or equated with reality, and thereby conceals nuances, shades, and subtleties of what it represents, the consequences can become socially mischievous.

Something of the latter sort has occurred regarding genetic engineering of animals. The myth has acquired too literal a status in the social mind. People think as follows: Frankenstein created new life with (potentially) hellish consequences; therefore genetic engineering is well represented by "the Frankenstein thing." The myth is either accepted as literal truth or categorically rejected as nonsense, with little thought for the possibilities in between, where the truth surely lies. This dichotomized tendency pervades social thought on genetic engineering and blocks and forestalls any meaningful attempt to place it under meaningful social control or to orchestrate practicable social policies. As an official of the Office of Technology Assessment (OTA; the arm of Congress that advises Congress on new advances in science and technology) informed me when I testified before them: "Congress gets thousands of letters on genetic engineering every week, but they are not helpful. They either tell us to stop all genetic engineering immediately and unequivocally because it violates the laws of God and/or nature; or they demand that we let it forge ahead in an unrestricted way, else we won't be able to compete with the Japanese."

In the end, genetic engineering of animals cannot be stopped – it is too simple and relatively inexpensive to accomplish. Were it banned in the United States, it would simply be moved to a less restrictive (and less regulatory) environment. Not only would we lose patent and incalculable social and

Introduction

economic benefits that can accrue to society (and animals) from its proper use, we would lose control of the technology. On the other hand, the technology needs to be controlled, for a variety of reasons and in a variety of dimensions I will detail in the following chapters.

But as the OTA experience indicates, simplistic acceptance (or rejection) of the Frankenstein story as a way for the social mind to categorize the genetic engineering of animals militates against thinking through the issues that should be considered. And few people have pressed for such consideration; as late as 1986, I was the only person who had written any papers on the moral issues occasioned by the technology, though numerous missives had appeared either extolling its virtues as a ticket to paradise or condemning it unequivocally as a ticket to hell.

As we shall see, what forestalls proper social consideration of scientific and technological advances in biotechnology and other areas is something of a "double whammy." Scientists tend to welcome all new technological and scientific discoveries as positive achievements and to shun discussion of the ethical or social issues they occasion. The public in general tends to be scientifically naïve and thus insufficiently knowledgeable to articulate the moral and social issues either. The resultant lacuna is either not filled at all, or it is filled by those with sensationalistic, attention-catching perspectives on the issues. This has been demonstrated over the past two decades with the issue of the care and use of laboratory animals, with the research community insisting that only by having carte blanche with animals could it cure disease, and animal advocates demanding an immediate end to animal research. Fortunately, new (1985) legislation passed between the horns of this dilemma and has moved ahead both the ethic and the treatment of animals.⁵ Even more importantly, it has provided guideposts for what is to count as future moral progress in this area and has changed the thinking of many of those who use animals. As a person who was involved both in thinking through the philosophical basis of our moral obliga-

Introduction

tions to animals and in writing what became the federal law implementing that emerging ethic, I have enjoyed firsthand experience in seeing how social moral progress occurs.

A similarly polarizing situation exists currently regarding the genetic engineering of animals, as we have seen. Yet we have hitherto avoided engaging the issues it occasions, both conceptually and pragmatically – this despite the enormous potential power of the technology to change both our lives and the lives of animals, and even the environment. Such a situation is unconscionable and ultimately untenable. We cannot control technology if we do not understand it, and we cannot understand it without a careful discussion of the moral questions to which it gives rise.

Our task, then, in this book is to dissect out these moral issues in the case of genetic engineering of animals and to disambiguate the genuine moral issues from the spurious ones. At the same time, we must also consider the best vehicle for pragmatically dealing with these matters in society.

In order to accomplish this task, we will take the Frankenstein myth as our point of departure. Given the pervasiveness of the myth and given the correlative inevitability of society using the myth as a category for assessing genetic engineering, it is reasonable to unpack its many components and strata in order to lay bare the real issues and dissect out the spurious, knee-jerk ones. Not surprisingly, we will find that while certain aspects of the Frankenstein story do, indeed, admirably express legitimate concerns and reservations, others in fact deflect attention from such concerns and carry the social mind in nonhelpful directions.